DNA Profiling

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Published in:
Journal of Criminal Law

DOI:
10.1177/0022018317721641

Publication date:
2017

Document Version
Peer reviewed version

Court of Appeal (Criminal Division)

DNA Profiling: Transfer and Persistence

R v Tsekiri [2017] EWCA Crim 40

On 11th June 2016, Ms. Carr, the victim, unlocked her vehicle, which was parked on a street near Wimbledon Park Tube Station. At this point, an unidentified man attempted to enter the car. A brief struggle ensued and the man escaped with Ms. Carr's gold necklace. Swabs were taken from the exterior door handle of the vehicle and these revealed a mixed DNA profile. The profile belonging to the major contributor was consistent with that taken from the appellant (with a match probability of one in one billion). There was at least one other minor contributor. The reporting scientist could reach no determination as to when the major components of the mixed DNA profile had been deposited, nor their source. The deposit could have been due to that person touching the door handle, or due to indirect secondary transfer through an intermediary (though she considered this unlikely, given that the DNA in question was the major contributor to the profile). The appellant submitted that there was no case to answer given the dearth of evidence.

Held, dismissing the appeal, "…there is no evidential or legal principle which prevents a case solely dependent on the presence of the defendant's DNA profile on an article left at the scene of a crime being considered by a jury." (per Lord Thomas at [21]). Whether the evidence is sufficient will depend on the facts of the case. However, the court provided a non-exhaustive list of relevant factors to be taken into account:

- Can the presence of the DNA evidence be otherwise accounted for?
- Was the article apparently associated with the offence itself?
- How readily moveable was the article in question?
- Is there evidence of some geographical association between the offence and the offender?

- In the case of a mixed profile, is the DNA profile which matches the defendant, the major contributor?
- Is it more or less likely that the DNA profile attributable to the defendant was deposited by primary, or secondary, transfer? (at [15] – [21]).

Commentary

In his 2014 Kalisher lecture to the Criminal Bar Association (*Expert Evidence: The future of forensic science in criminal trials*, 14th October 2014), the Lord Chief Justice, the Rt. Hon. The Lord Thomas of Cwmgiedd, expressed concerns regarding the potential of new, or complex, scientific developments to tarnish the status of forensic DNA profiling. Lord Thomas identified the 'challenge for all…advocates and judges: to manage the presentation and testing of forensic evidence in such a way as to avoid fatally undermining confidence.' (at [14]). The judiciary's concern to maintain public confidence in this forensic keystone is well founded, given the unparalleled discriminatory power of DNA profiling techniques, and their unique ability to link the bio-identities of suspect populations to an ineradicable bodily substrate.

Such is the importance of forensic DNA to the criminal justice system that the Home Office have gone to great lengths in their attempts to ensure that the reputation of DNA profiling - as the 'gold standard' of forensic identification tools - remains secure (Home Office (2008) A Review of the Science of Low Template DNA Analysis. London: The Stationery Office). Nonetheless, concerns over the integrity of DNA profiling techniques remain, and the endurance of these concerns may go some way to explaining the decision in *R v Tsekiri*, in which the Court of Appeal of England and Wales addressed the problematic issue of DNA 'transfer and persistence'. As will be demonstrated below, the sensitivity of cutting-edge forensic techniques now allows for the detection of minute traces of DNA, with potentially groundbreaking results (see, for example, *HMA v Sinclair*, HCJAC 131 (2014)). However, in those cases where the DNA sample cannot be conclusively linked to an activity, then the probative value of DNA may be severely compromised (see, for example, *HMA v Tobin* 2008 GWD 40-607 ; *Fitzgerald v The Queen* [2014] HCA 28). Cases testing the science of

DNA profiling are extremely rare, and have generally been confined to the Court of Appeal of England and Wales (*R v Reed, Reed and Garmson* [2009] EWCA Crim 2698 ; *R v T* [2010] EWCA Crim 2439; *R v Dlugosz* [2013] EWCA Crim 2). Whilst the court's decision may help to maintain confidence in the probative value of forensic DNA profiling techniques, it may be argued that the judiciary have purchased security at the price of accuracy. The Court of Appeal previously emphasised the need to place DNA evidence in context:

> '…if the DNA evidence stood alone, you could not convict on it on any count. But it does not stand alone and you will consider its value very carefully and use it as part of the evidence when you consider each count individually in the case as a whole.' (*R v Reed, Reed and Garmson* [2009] EWCA Crim 2698).

However, this latest development opens the door for conviction on a sole piece of DNA evidence, provided the match probability is of a sufficient strength. Further, the inclusion of a list of factors to be taken into account, in those cases involving mixed profiles, would appear to be predicated on a misunderstanding of the current limitations of DNA profiling techniques.

Indeed, the case highlights a growing problem for DNA profiling experts, whose technologies are now so sensitive that they routinely report 'mixed' samples, including deposits made indirectly through intermediate contacts, and low-template DNA shed naturally by individuals, and spread through contact and dispersal. In many cases, scientists can de-convolute mixed samples using their expertise, often with the aid of complex computer algorithms. The de-convoluted results may reveal a major contributor, and one - or more - minor contributors, all of whose profiles may be complete, or partial.

However, the evaluative problems are not limited to attribution. Whilst individual profiles may be 'matched' to individuals on the DNA database - with probabilities in the order of one in one billion - the resulting evidence may be effectively neutralised by the issue of the transfer and persistence of DNA deposits across multiple surfaces. The interposition of such issues shifts the focus of analysis, such that the courts should no longer address themselves to the question of 'to whom does this DNA

sample belong?' The salient question becomes, 'how did this DNA sample come to get here?' (Taroni F., Biedermann A., Vuille J., Morling N. (2013). Whose DNA is this? How relevant a question? (a note for forensic scientists). Forensic Sci. Int. Genet. 7, 467–470).

Given that different individuals shed epithelial 'touch' DNA at different rates; that different surfaces retain DNA at different rates; and that DNA may be deposited by secondary, or even tertiary, intermediaries (not to mention the presence of environmental factors); the task of answering activity propositions with any degree of certainty may prove difficult, if not impossible. Despite some rigorous attempts to establish a coherent database in respect of DNA transfer and persistence, research remains sporadic, and the results lack meaningful generalisability. See, for example: C. Davies, et al., *Assessing primary, secondary and tertiary DNA transfer using the Promega ESI-17 Fast PCR chemistry*, Forensic Sci. Int. Gene. Suppl. (2015).

The problem is encapsulated in this excerpt from a research interview with a lead DNA profiling scientist. She considers a hypothetical situation based on the analysis of a profile recovered from a pair of gloves left at the scene of a robbery. The suspect claims that the gloves are his, but that they were borrowed by another individual:

> 'So now, the question is, "how did the DNA get there?" And now all of the source attribution evidence is completely irrelevant. And, [for any suggested explanation], the reason that DNA matching him is on the gloves is because he wore them, but I can't tell you when he wore them, when was the last time he wore them, when his DNA was deposited, and in some cases, if it's very weak, I can't even tell you whether he deposited his DNA or if it went there through another individual or surface. It varies from individual to individual as well as condition to condition, surface to surface. The suspect could have been wearing them every day and he's still only a minority contributor…You cant 'weight' transfer and persistence.' (Interview with DNA lead scientist (Tier 2 forensic science provider), Oxford, 2015.)

The above concerns are supported by laboratory studies, which demonstrate that DNA, deposited on an object as a result of secondary transfer, is frequently identified as either the only contribution, or the major contribution, to a mixed profile, despite the contributing individual never coming into direct contact with the object (see, for example, Cale CM, Bush GL, Earll ME & Latham KE (2016) Could Secondary DNA Transfer Falsely Place Someone at the Scene of a Crime? Journal of Forensic Science, January 2016;61(1): pp.196-203). Such studies illustrate the risks of assuming that DNA, recovered from an object, results from a direct contact. They also cast doubt on the Court of Appeal's approach to such issues, given that the latter are effectively attempting to weight transfer and persistence. Indeed, further questions are raised as to whether it was possible for the court in *Tsekiri* to arrive at strong assertions, such that 'there can be no doubt that the offender did touch the article in question.' (at [16]). Further, studies would appear to confound the bare proposition that 'secondary transfer was an unlikely explanation for the presence of the appellant's DNA on the door handle.' (at [19]). Nor does the connection between the suspect, and a particular geographical location (at [18]) necessarily aid determination, since such a connection may be equally supportive of secondary transfer scenarios.

The failure of the Courts to take this opportunity to address the pressing problem of DNA transfer and persistence is perhaps understandable, given that the evidence in the above case was not subject to rigorous cross-examination. However, both practitioners, and the courts, should be aware of the issues involved, alive to the importance of context, and wary of attempts to collapse the question of 'how' into the less scientifically problematic question of 'who?' Whilst there may be a number of economic, policy, and procedural reasons, for such an approach - centring on the perceived necessity to maintain the unblemished status of forensic DNA - attempts to evade the pressing question of transfer and persistence may provide only temporary security.

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